

What is claimed is:

1 A membrane translocation peptide/carrier moiety comprising of formula;

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RQIKIWFQNRRMKWKK (SEQ ID No. 1)

1 16

wherein at least one amino acid residue is deleted from the amino terminus, or variants thereof.

2. A carrier moiety according to claim 1, wherein up to 9 amino acids are deleted.

3. A carrier moiety according to claim 2, wherein from 6 to 9 amino acids are deleted.

4. A carrier moiety according to claim 3, wherein 9 amino acids are deleted.

5. A carrier moiety according to claim 3, selected from the group consisting of:  
20 RRMKWKK, NRRMKWKK, ONRRMKWKK and FONRRMKWKK.

6. A variant of a carrier moiety of claim 1, wherein (a) one or more amino acid residues are replaced by a naturally or non-naturally occurring amino acid residue (b) one or more amino acid residues are reversed, (c) both (a) and (b) are present together. 25 (d) a spacer group is present between any two amino acid residues or (e) one or more amino acid residues are in peptoid form (f) the (N-C-C) backbone of one or more amino acid residues of the peptide has been modified, or any of (a)-(f) in combination.

7. A carrier moiety according to claim 6, selected from the group consisting of:  
30 KRMKWKK, RKMKWKK, RREKWKK, RRQKWKK, RROKWKK, RRMKOKK.

RRMKWFK, RORKWKK, RRMWKKK, RROWKKK, RRMKKWK and RROKKWK.

8. A carrier moiety according to claim 1, represented by any of compounds 2-20.

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9. A membrane translocation peptide carrier moiety comprising of formula;

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10 wherein at least one amino acid residue is replaced by an alternative natural or unnatural replacement  $\alpha$ -amino acid residue.

10. A carrier moiety according to claim 9, wherein the sixth amino acid from the amino terminus is not tryptophan.

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11. A carrier moiety according to claim 9, wherein the replacement  $\alpha$ -amino acid residue is selected from the group consisting of: residues of alanine, arginine, asparagine, aspartic acid, cysteine, glutamic acid, glutamine, glycine, histidine, isoleucine, leucine, lysine, methionine, phenylalanine, proline, serine, threonine, 20 tryptophan, tyrosine, and valine.

12. A carrier moiety according to claim 11, represented by any of compounds 21-36.

25 13. A carrier moiety of claim 1, wherein free carboxyl group of the carboxy terminal amino acid residue is in the form -C(O)-NRR', wherein R and R' are each independently selected from the group consisting of: hydrogen, C1-6 alkyl, C1-6 alkylene or C1-6 alkynyl, aryl, each optionally substituted by heteroatoms such as O, S or N.

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14. A carrier moiety according to claim 13, wherein free carboxyl group of the carboxy terminal amino acid residue is a carboxamide group.

15. A carrier moiety according to claim 14, of the formula RRMKWKK-NH<sub>2</sub>.

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16. A carrier moiety according to claim 1, wherein the peptide is comprised of amino acid residues in their L form.

17. A carrier moiety according to claim 1, wherein the peptide is comprised of 10 amino acid residues in their D form.

18. A carrier moiety according to claim 16, wherein the peptide is in the *retro* form.

15 19. A membrane translocation vector comprising a membrane translocation peptide carrier moiety as defined claim 1, linked to a cargo moiety.

20. A translocation vector according to claim 19, wherein the cargo moiety is selected from the group consisting of: an oligonucleotide, nucleotide, protein, peptide, 20 biologically active compound and a diagnostic agent.

21. A translocation vector according to claim 20, wherein the cargo moiety is an oligonucleotide or nucleotide selected from the group consisting of: genes, gene fragments, sequences of DNA, cDNA, RNA, nucleotides, nucleosides, heterocyclic 25 bases, synthetic and non-synthetic, sense oligonucleotides, and anti-sense oligonucleotides.

22. A translocation vector according to claim 20, wherein the cargo moiety is a protein or peptide that interferes with the cell cycle.

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23. A translocation vector according to claim 22, wherein the cargo moiety is selected from the group consisting of: p53 peptide fragments, p21<sup>WAF</sup> peptide fragments, Fen1 peptide fragments and p16 peptide fragments.

5 24. A translocation vector according to claim 20, wherein the cargo moiety is a drug.

25. A translocation vector according to claim 24, wherein the cargo moiety is derived from a cytotoxic drug.

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26. A translocation vector according to claim 25, wherein the cargo moiety is selected from the group consisting of: ~~DNA~~ damaging agents, anti-metabolites, anti-tumour antibiotics, natural products and their analogues, dihydrofolate reductase inhibitors, pyrimidine analogues, purine analogues, cyclin-dependent kinase inhibitors, thymidylate synthase inhibitors, DNA intercalators, DNA cleavers, topoisomerase inhibitors, ~~anthracyclines~~, vinca drugs, mitomycins, bleomycins, cytotoxic nucleosides, pteridine drugs, dynenes, podophyllotoxins, platinum containing drugs, differentiation inducers and taxanes.

20 27. A translocation vector according to claim 26, wherein the cargo moiety is the group consisting of: methotrexate, methopterin, dichloromethotrexate, 5-fluorouracil, 6-mercaptopurine, tri-substituted purines such as olomoucine, roscovitine and bohemine, flavopiridol, staurosporin, cytosine arabinoside, melphalan, leurosine, actinomycin, daunorubicin, doxorubicin, mitomycin D, mitomycin A, carinomycin, 25 aminopterin, talysomycin, podophyllotoxin, etoposide, cisplatin, carboplatinum, vinblastine, vincristine, vindesine, paclitaxel, docetaxel, taxotere retinoic acid, butyric acid, acetyl spermidine, tamoxifen, irinotecan and camptothecin.

28. A translocation vector according to claim 19, wherein the cargo moiety is 30 directly linked to the carrier moiety.

29. A translocation vector according to claims 19, wherein the cargo moiety is indirectly linked to the carrier moiety by means of a linker moiety.

5 30. A translocation vector according to claim 19, further comprising a targeting moiety.

31. A translocation vector according to claim 30, wherein the targeting moiety is attached to the carrier moiety.

10 32. A translocation vector according to claim 30, wherein the targeting moiety is attached to the cargo moiety.

15 33. A translocation vector according to claim 19, wherein each carrier moiety bears more than one cargo moiety.

34. A translocation vector according to claim 33, wherein the cargo moieties are different.

20 35. A translocation vector according to claim 33, wherein the cargo moieties are attached to the carrier by a network of lysine residues.

36. A translocation vector according to claim 19, wherein the carrier moiety peptide is comprised of amino acid residues in their L form.

25 37. A translocation vector according to claim 19, wherein the carrier moiety peptide is comprised of amino acid residues in their D form.

38. A translocation vector according to claims 19, wherein the carrier moiety peptide is in the *retro* form.

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39. A translocation vector according to claim 23, wherein both the carrier moiety peptide and the cargo moiety are in the L form.

5 40. A translocation vector according to claim 23, wherein both the carrier moiety peptide and the cargo moiety are in the D form.

41. A translocation vector according to claim 23, wherein the carrier moiety peptide is in the D form and the cargo moiety in the L form.

10 42. A translocation vector according to claim 23, wherein the carrier moiety peptide is in the L form and the cargo moiety in the D form.

15 43. A vector according to claim 19, that translocates the cell membrane and remains in the cytosol.

44. A vector according to claims 19, that translocates the cell membrane and the nuclear membrane.

20 45. A membrane translocation peptide carrier moiety comprising up to 15 amino acid residues and at least the peptide for formula;

RRMKWKK (I)

25 or variants thereof.

46. A delivery systems selected from the group consisting of::

#	Drug moiety	Linker moiety	Carrier moiety
	paclitaxel	2'-succinimidopropionoyl-C $\beta$ A	RRMKWKK-NH <sub>2</sub>
	podophyllotoxin	4-succinimidopropionoyl-C $\beta$ A	RRMKWKK-NH <sub>2</sub>
	podophyllotoxin	4-succinimidopropionoyl-C $\beta$ A	(D-R)(D-R)(D-M)(D-K)(D-W)(D-K)(D-K-NH <sub>2</sub> )
	epipodophyllotoxin	4'-succinimidopropionoyl-C $\beta$ A	RRMKWKK-NH <sub>2</sub>
	podophyllotoxin	4-acetyl-C $\beta$ A	RRMKWKK-NH <sub>2</sub>
	4'-demethyl epipodophyllotoxin	4-acetyl-C $\beta$ A	RRMKWKK-NH <sub>2</sub>
	podophyllotoxin	4-succinimidopropionoyl-GC $\beta$ A	RRMKWKK-NH <sub>2</sub>
C-term	podophyllotoxin	4-succinimidopropionoyl-C	RRMKWKK
N-term	podophyllotoxin	4-succinimidopropionoyl-C	
N-term	epipodophyllotoxin	4'-succinimidopropionoyl-C	RRMKWKK
C-term	camptothecin	10-O-succinimidopropionoyl-C	
N-term	epipodophyllotoxin	4'-succinimidopropionoyl-C	RRMKWKK
C-term	paclitaxel	2'-(succinimido)propionoyl-C	
	4'-methoxy-epipodophyllotoxin	4-(4"-aminoanilino)succinimidopropionoyl-C $\beta$ A	RRMKWKK-NH <sub>2</sub>
	4'-demethyl-epipodophyllotoxin	4-(4"-aminoanilino)succinimidopropionoyl-C $\beta$ A	RRMKWKK-NH <sub>2</sub>

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